Solubility and thermodynamic function of carbamazepine-saccharin (CBZ-SAC) co-crystal in ethanolic solution

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Abstract:

The aim of study was to assess solubility and thermodynamic function of CBZ-SAC co-crystal in varying SAC concentrations in ethanolic solution at temperatures (25-50 oC). Experimental solubilities of CBZ-SAC co-crystal were determined by gravimetric and high performance liquid chromatography (HPLC) methods. Experimental solubilities of co-crystal in mole fraction from HPLC method were correlated well with Van't Hoff model. The solubilities of co-crystal were obtained highest in CBZ : SAC with ratio of 1.00 : 1.00 and the co-crystal solubility is higher than the pure form of CBZ (Fig.1) [1]. Based on the apparent thermodynamic analysis parameter, it was indicated an "endothermic and entropy-driven dissolution" of CBZ-SAC co-crystal [2,3,4]. From these results, CBZ-SAC co-crystal has been considered freely soluble in ethanol solution with non-SAC excess.